



Santa Barbara County  
Air Pollution Control District

PERMIT TO OPERATE 9822

Page 1 of 5

EQUIPMENT OWNER and OPERATOR :

Santa Barbara County Solid Waste and Utilities Division

STATIONARY SOURCE DESIGNATION

Foxen Canyon Landfill

[SSID & FID No.: 3706]

FACILITY LOCATION:

Foxen Canyon Landfill, 4004 Foxen Canyon Road, near Los Olivos, California

EQUIPMENT DESCRIPTION:

Equipment items authorized for installation:

1. Landfill gas ("LFG") collection wells (approximately 12 active) located within the landfill and along the Foxen Canyon Landfill southern boundary as shown on plot plan "Plate No. 1" in the project file. Each well is equipped with a sample port for measuring gas composition, flow rate, pressure and temperature;
2. An above-ground LFG collection piping system connecting each well to the LFG blower/flare station;
3. Blower/Flare Skid comprised of: a) one, LFG condensate knockout vessel; b) one, 10-BHP electric motor powered LFG gas blower used to draw gas from the collection system and deliver it to the flare burner manifold; and c) one open-pipe flare described in item 4 below;
4. Open-pipe flare, 6-inch diameter by 15-feet high, rated to 8.96 MMBtu/hr but enforceably limited to a maximum heat release rate of 4.96 MMBtu/hr, manufactured by Landfill Gas Specialties, used to flare the collected landfill gas. The flare is equipped with an automatic, electronically ignited, propane fired pilot, a "LFG System Timer", and a safety shutdown system. The safety system stops the flow of LFG to the flare if the flare flame is extinguished; and
5. A 250-gallon LFG condensate storage tank.

## PERMIT TO OPERATE 9822

Page 2 of 5

### EXEMPT EQUIPMENT

The following equipment is exempt from permitting under APCD rules and regulations:

1. One diesel-fired, internal combustion engine driven electrical generator, rated at 57 bhp, manufactured by MQ Power Corp, model number DCA-40SSI (Rule 202.F.1.e); and
2. Two, 5-gallon propane fuel tanks for the flare pilot (Rule 202.V.8).

### PROCESS DESCRIPTION:

Landfill gas, which contains 30% to 60% methane, is produced when buried refuse decomposes. This permit is for equipment that will intercept and collect LFG from the southern boundary of the Foxen Canyon Landfill prior to this gas exiting the landfill's southern boundary. The gas collection system will utilize approximately twelve vertical wells ranging from 20 to 60 feet deep. The LFG is collected by use of an electric blower to create a vacuum on each of the wells. Condensate, primarily water, is scrubbed out of the collected LFG and delivered to the 250-gallon above-ground condensate storage tank. This condensate is periodically removed from this vessel for proper disposal elsewhere, typically at an approved waste-water treatment facility. The destruction of the collected landfill gas will occur at the elevated open-pipe type flare, which is designed to operate at a 98% ROC destruction efficiency. The collection blower and flare system may not operate continuously because this system may collect methane faster than the landfill produces it in this area. To handle this need, the collection blower and flare system are equipped with a timer ("LFG System Timer") that is currently (as of May 1998) operating the system at a 50% duty cycle.

### CONDITIONS:

1. **Throughput Limitations.** The following throughput limitations shall not be exceeded:
  - a) Gas consumption (flare): 8,406 SCF/hour of 590 Btu/SCF High Heating Value LFG; or
  - b) Flare Heat Release: 4.96 MMBtu/hr
  - c) Only propane fuel meeting Gas Producers Association standards for quality shall be burned in the flare pilots.

Compliance with the above-specified limits will be determined through Condition 5 records.

2. **Gaseous Fuel Sulfur Limit.** The total sulfur content (calculated as H<sub>2</sub>S at standard conditions, 60°F and 14.7 psia) of the landfill gas burned in the flare shall not exceed 13.1 grains per 100 cubic feet (100 ppmv).

The permittee shall measure the total sulfur content of gaseous fuel on a quarterly basis in accordance with current ASTM-D1072 or a APCD approved equivalent method. Records shall be kept on site

PERMIT TO OPERATE 9822

Page 3 of 5

and made available for inspection by the APCD upon request.

3. **Emissions Limitation.** Emissions shall not exceed the limitations shown in Table 1. Compliance with the emission limits will be verified through compliance with the Throughput and Operational Limitations, and Recordkeeping conditions of this permit.
4. **Operational Limitations.** The operation of the LFG collection system and flare is subject to the following limitations:
  - a) The pilot flame shall be operating at all times the flare is initially capable of accepting LFG for flaring. The pilot flame may be shutdown only if the primary flare flame generated from LFG combustion is apparent.
  - b) LFG flow to the flare shall cease whenever the open-pipe flare flame is extinguished.
  - c) LFG condensate shall only be disposed of through off-site shipment to an approved disposal facility.
5. **Recordkeeping.** The following records (electronic or hard copy) shall be maintained by the permittee and shall be made available to the APCD upon request:
  - a) On a weekly basis, the volumetric flow rate of LFG (SCFM or SCFH) collected and burned by the flare shall be measured and recorded by the *GEM 500* instrument, the "Oripac" conversion table, or an APCD-approved equivalent method.
  - b) On a weekly basis, the total number of hours the flare burns LFG;
  - c) On a weekly basis, the total quantity of LFG burned shall be calculated and recorded (i.e., SCF/week). This total shall be based on the data recorded pursuant to subconditions a) and b) above by multiplying the hourly-equivalent LFG flow rate (i.e., SCFH) by the number of hours the flare burns LFG for the week;
  - d) On a quarterly basis, the heating value (BTU/SCF) and total sulfur content (in ppmv) of the LFG shall be measured and recorded using suitable ASTM or other APCD-approved methods.
  - e) On a quarterly basis, records of the quantity (gallons) of LFG condensate shipped off-site. For each shipment, a manifest or other equivalent record shall be kept of the LFG condensate's disposition.
6. **Reporting Requirements.** By March 1 of each year, a report detailing the previous calendar year's activities shall be provided to the APCD. The report shall list all data required by Condition 5 (Recordkeeping) of this permit and shall summarize the data on a monthly basis.

PERMIT TO OPERATE 9822

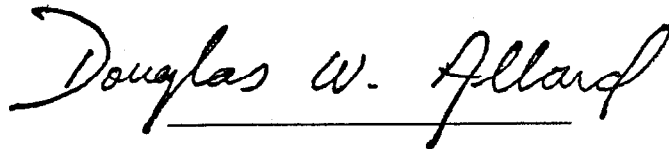
Page 4 of 5

7. **Equipment Operation.** Operation under this permit shall be conducted in compliance with all data, specifications and assumptions included with the application (and supplements thereof) as documented in the APCD's project file and the attached APCD Engineering Evaluation under which this permit is issued.
8. **Compliance.** Nothing contained within this permit shall be construed to allow the violation of any APCD, State or Federal rule, regulation, ambient air quality standard or air quality increment.
9. **Severability.** If any condition herein is determined to be invalid, all other conditions shall remain in force.
10. **Effective Date of Permit.** THIS PERMIT SHALL BECOME EFFECTIVE ON THE ISSUANCE DATE STAMPED ON THIS PERMIT, UNLESS THE PERMIT APPLICANT PROVIDES WRITTEN NOTICE TO THE APCD AS PROVIDED BELOW.

This permit shall not become effective if the permit applicant provides written notice to the APCD on or before the effective date stamped on the permit which notifies the APCD that the applicant wishes to comment on the permit. If such notice is submitted, the applicant shall submit such comments to the APCD within 21 days of the cover letter date. ANY ORAL COMMUNICATION WITH THE APCD WILL NOT PREVENT THIS PERMIT FROM BECOMING FINAL.

If written notice is not provided to the APCD by the issuance date stamped on this permit, this permit shall become final, unless appealed to the Hearing Board within 10 days of the effective date of the permit, pursuant to APCD Rule 209. For purposes of this condition, a permit applicant means any owner or operator (existing or new) receiving a permit from the APCD.

AIR POLLUTION CONTROL OFFICER



JUN 01 1998

Date

Attachments: PTO 9822 Engineering Evaluation

Note:

- 1) This permit due for reevaluation: May 2001
- 2) This permit supercedes Authority to Construct 9822, issued November 12, 1997.

PERMIT TO OPERATE 9822

Page 5 of 5

Table 1

**Santa Barbara County - Foxen Canyon Landfill Flare  
Total Permitted Emissions<sup>(\*)</sup>**

Equipment	NO <sub>x</sub>	ROC	CO	SO <sub>x</sub>	TSP	PM <sub>10</sub>
Open-pipe Flare						
lb/day	8.7	1.0	109.5	3.5	2.4	2.4
TPY	1.6	0.18	20.0	0.63	0.43	0.43

Table 1 Notes:

- (\*) Emission limitations are based upon emission factors from EPA and the other references as documented in the APCD's Engineering Evaluation.



**Santa Barbara County  
Air Pollution Control District**

**ENGINEERING EVALUATION  
PERMIT TO OPERATE 9822**

Page 1

**BACKGROUND:**

This permit application (PTO 9822) was submitted on April 8, 1998 by the Santa Barbara County Public Works Department, Solid Waste and Utilities Division. This PTO authorizes the operations of a landfill gas ("LFG") collection system along the southern perimeter of the Foxen Canyon Landfill permitted for installation under ATC 9822, issued November 12, 1997. This system is designed to intercept, collect, and control through flaring, LFG which is currently migrating across the southern landfill boundary in concentrations exceeding 5 percent methane in air. This system is needed to comply with California law that prohibits such LFG migration offsite of a landfill. The LFG collection and flaring equipment is owned by Santa Barbara County, but is currently operated by Sepich Associates, Inc.

**PROCESS DESCRIPTION:**

Landfill gas, which contains 30% to 60% methane, is produced when buried refuse decomposes. This permit authorizes the operation of collection wells, a LFG collection piping system, and a gas collection blower, condensate knockout system, and open-pipe flare to combust the collected LFG. Any collected LFG condensate is stored in the 250-gallon tank prior to appropriate disposal, usually at an approved waste-water treatment facility. The destruction of the produced gas will occur at the open-pipe flare, which is designed to operate at a 98% ROC destruction efficiency.

**CALCULATIONS:**

The enclosed attachment contains the emission calculation worksheet. The pertinent results of those calculations are presented here to summarize the permitted emissions.

- A. **EMISSION FACTORS:** The applicant proposed certain emission factors obtained from two different reference sources. The APCD reviewed the applicant proposed emission factors, and found that the following emission factors best represented the operations of the open-pipe flare used to combust the collected LFG:

**ENGINEERING EVALUATION  
PERMIT TO OPERATE 9822**

**NOx:** The AP-42, Section 2.4, Table 2.4-5 (Rev. 1/95), which pertains to landfill gas control flare NOx emission factors, were not used. These were considered to represent a range of LFG flaring systems including enclosed thermal oxidizers which typically have higher combustion temperatures and thus higher NOx formation rates than open-pipe flare systems. Thus, the APCD considered that its July 1991, Santa Barbara County Flare Study (Table 3.1.1) NOx emission factor of 0.073 lb/MMBtu for an unassisted open-pipe flare, better assesses the NOx emissions from this system.

**ROC:** The applicant's proposed 98% by mass ROC destruction efficiency based emission rate was converted to a lb/MMBtu equivalent emission rate at the flare by converting AP-42, Section 2.4 (Rev. 1/95) landfill gas data for Municipal Solid Waste facilities having little organic commercial/industrial wastes (Table 2.4-1), as follows:

$$\text{Input ROC} = (8,406 \text{ SCF/hr LFG}) * (\text{lb-mole}/379 \text{ SCF}) * (942 \text{ SCF ROC}/10^6 \text{ SCF LFG}) * (99 \text{ lb ROC/lb-mole})$$

$$\text{Input ROC} = 2.07 \text{ lb/hr ROC}$$

$$\text{Output ROC} = (1.0 - 0.98) (\text{Input ROC}) = (0.02)(2.07 \text{ lb/hr}) = 0.041 \text{ lb/hr}$$

$$\text{Flare ROC Emission Factor} = \text{Output ROC} / \text{Flare HHV Release} = 0.041 \text{ lb/hr} / 4.96 \text{ MMBtu/hr} = \underline{0.0083 \text{ lb/MMBtu}}$$

**CO:** The applicant proposed use of the AP-42, Section 2.4 specified flare CO emission factor to model this flare's CO emissions. The AP-42 emission factor is converted to a lb/MMBtu equivalent factor as follows:

$$0.050 \text{ lb CO/hr-dSCFM C1} * 600 \text{ SCFM LFG} * 0.60 \text{ SCF C1/SCF LFG} / 19.656 \text{ MMBtu/hr} =$$

$$\underline{0.92 \text{ lb/MMBtu}}$$

**PM10:** As no AP-42, Section 2.4 emission factor is presented for this pollutant, the APCD has deferred to the factor identified by the applicant. This factor was obtained from the APCD's July 1991 Flare Study (Table 3.1.1), and is 0.0202 lb/MMBtu. In addition, the TSP to PM10 ratio is assumed to be 1.0, therefore TSP also equals 0.0202 lb/MMBtu.

**SOx:** The APCD concurred with the applicant's proposed SOx emission factor based upon a sulfur mass balance and 100 ppmv of total LFG fuel sulfur. The SOx emission factor is calculated as follows:

$$\text{lb/MMBtu} = 0.169 * (100 \text{ ppmv}) / (590 \text{ Btu/SCF}) = \underline{0.029 \text{ lb/MMBtu}}$$

**ENGINEERING EVALUATION  
PERMIT TO OPERATE 9822**

- B. POTENTIAL TO EMIT (PTE): Maximum hourly and annual emissions will occur if the flare is operated at its maximum hourly throughput level, 24 hours a day, 7 days a week, and up to 8760 hours per year. A calculation of the open-pipe flare's emissions using the above-specified emission factors and an APCD spreadsheet program is attached to this evaluation.
- C. CRITERIA POLLUTANT EMISSIONS: Table 1 of the PTO summarizes the total permitted emissions (PPTE & FPTE), net emission increase (FNEI-90), for the permitted equipment of this project. The entire source emissions for this project also includes the exempt diesel-fired IC engine-driven electrical generator, and a diesel-fuel storage tank. The diesel-fuel storage tank is considered to emit very small quantities of ROC emissions (i.e., < 0.01 ton/yr) and has not been quantified. An attachment to this evaluation documents the anticipated diesel-engine emissions for this project assuming the engine operates at full load for 8760 hours per year. In actual conditions, the engine is expected to operate in average conditions at approximately 1/4 of full load. The emission factors for this engine were obtained from APCD-70B (Rev 6/7/97) for uncontrolled diesel engines (section B.1) and are primarily derived from AP-42 emission factor data.

Exempt Emissions

Equipment Item	NOx	ROC	CO	SOx	TSP	PM10
57 bhp Diesel Genset						
(lb/day)	41.1	2.8	8.8	4.7	2.9	2.8
TPY	7.5	0.51	1.61	0.87	0.53	0.51

**BEST AVAILABLE CONTROL TECHNOLOGY DISCUSSION:**

A BACT review was not required. No attainment or non-attainment pollutant emission rate for this project triggered such a review pursuant to Rule 802 or 803.

**INSPECTION REPORT:**

This equipment was inspected by an APCD inspector on January 8, 1998. The inspector found some minor equipment changes from that specified under the ATC 9822 had occurred, as follows:

- A 10 bhp electric landfill gas blower was installed rather than a 3 bhp model;
- A 57 bhp diesel-fired electrical generator was being utilized rather than a 31 bhp model; and



**ENGINEERING EVALUATION  
PERMIT TO OPERATE 9822**

- That a 500 gallon above-ground diesel fuel storage tank was not installed. The engine driven generator only utilizes a built-in 100 gallon diesel fuel tank.

The inspector also determined that the permittee was not keeping records on landfill gas volumes burned, and landfill gas total sulfur and heating values. AI Doc Number 5890 was issued to address this discrepancy. On January 23, 1998, the permittee submitted records to the APCD to address the deficiencies noted in AI Doc 5890. During a completeness review of this Permit to Operate application, these records were reviewed and found complete. Thus, AI Doc 5890 was closed on May 8, 1998. Further, all the equipment authorized for construction and limited operations under the SCDP of ATC 9822 appeared to be in compliance with all applicable APCD rules and permit conditions at that date.

**RULES IN COMPLIANCE:**

- Rule 101. Compliance of Existing Facilities
- Rule 201. Permits Required
- Rule 202. Exemptions to Rule 201
- Rule 205. Standards for Granting Permits
- Rule 210. Fees
- Rule 301. Circumvention
- Rule 302. Visible Emissions
- Rule 303. Nuisance
- Rule 309. Specific Contaminants
- Rule 310. Odorous Organic Sulfides
- Rule 311. Sulfur Content of Fuels
- Rule 341. Municipal Solid Waste Landfills
- Rule 802. Nonattainment Review
- Rule 803. Prevention of Significant Deterioration

**RULES REQUIRING FURTHER DISCUSSION:**

Rule 341. Municipal Solid Waste Landfills: The landfill gas collection and control system permitted to operate under this permit was not installed to comply with the requirements of this rule. Rather, the limited size system operating under this permit was installed to comply with state regulation which prohibits offsite migration of methane from a landfill in excess of 5% methane in air concentrations.

It is important to note that the system installed under this permit does not have the design capacity to fully capture all of this landfill's fugitive organic gas emissions. Full control would be required if the Foxen Canyon Landfill were subject to Rule 341 requirements and federal NSPS in 40 CFR, subpart Cc. However, such control is not required at this landfill because the demonstrated in place refuse

**ENGINEERING EVALUATION  
PERMIT TO OPERATE 9822**

capacity is less than 2.5 million megagrams, and it emits less than 50 megagrams of Non-methane organic gases ("NMOC").<sup>1</sup>

**RECOMMENDATIONS:**


- [X] Approve with conditions as shown in the PTO. ATC 9822 Recordkeeping conditions in regards to landfill gas total sulfur and high heating value analyses, were reduced in frequency from monthly to quarterly, based on the significant "compliance cushion" demonstrated in these characteristics during the SCDP.

**FEE CALCULATION:**

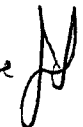
The cost for this permit is assessed based on Rule 210, Schedule A (Revision: July 1, 1997) for the permitted equipment. The calculated fees are summarized in the table below:

Item #	Fee Item Description	Fee Schedule	# of Units	Unit Dimensions	\$/Unit	\$/Equip. Item
1	Seven Collection Wells	A.1	7	Misc. Item	42.28	295.96
2	Collection System Piping	A.1	1	Misc. Item	42.28	42.28
3	LFG Condensate Vessel (<1000 gallons)	A.6	1	Container	42.00	42.00
4.a	10-bhp Electric Blower Actual **	A.2	7	Elec. Mtr.	21.93	153.51
4.b	10-bhp Electric Blower	A.2	10	Elec. Mtr.	21.93	219.30
5	Open Pipe Flare	A.3	4.96	MMBtu/hr	317.11	1572.87
6	250-gal Condensate Tank (<1000 gallons)	A.6	1	Container	42.00	42.00
						\$2,367.92
Grand Total Rounded Down to Nearest Whole \$						\$2,367.00

Note \*\*: This line item represent a charge for the incremental 7 bhp increase in blower bhp installed under the ATC. This incremental bhp was not charged for under the ATC 9822, but is now assessed

  
Steve Sterner  
Evaluator

May 11, 1998  
Date

  
Jerry Schieff  
Reviewer

5-22-98  
Date

<sup>1</sup> Reference: Foxen Canyon Landfill Design Capacity Report, Santa Barbara County Public Works Department, June 10, 1997.

**ENGINEERING EVALUATION  
PERMIT TO OPERATE 9822**

**ATTACHMENT - Emission Calculation Worksheets**

<u>ATTACHMENT ITEM</u>	<u>EMISSION CALCULATIONS FOR:</u>
1	Open-Pipe LFG Flare
2	Exempt Diesel-fired IC Engine Electrical Generator

Attachment: 1

Date: 10/29/97

## Landfill Gas Fired Flare CALCULATION WORKSHEET (ver. 5.0)

**DATA**

Permit No. ....	9822
Owner/Operator .....	SB County/Sepich Assoc. Inc.
Facility/Lease .....	Foxen Landfill
Flare Type .....	Firetube
Mfg. ....	Landfill Gas Specialties
Model No. ....	LFG&E - 8.96
Serial/ID No. ....	no data
Horsepower .....	no data Bhp
Burner Type .....	Gas
Burner Mfg. ....	Landfill Gas Specialties
Burner Model No. ....	no data
Max. Firing Rate of Burner .....	4.960 MMBtu/hr
Max. Annual Heat Input .....	43,450.000 MMBtu/yr
Daily Operating schedule .....	24 hrs/day
Yearly Load factor (%) .....	100 %
Fuel Type .....	Other
High Heating Value .....	590 Btu/scf
Sulfur Content of Fuel .....	100.00 ppmvd as H <sub>2</sub> S
Nitrogen Content of Fuel .....	- wt. % N
Boiler Classification .....	Commercial
Firing Type (Utility Only) .....	n/a
PM Emission Factor .....	0.0200 lb/MMBtu
PM <sub>10</sub> Emission Factor .....	0.0200 lb/MMBtu
NO <sub>x</sub> Emission Factor .....	0.0730 lb/MMBtu
SO <sub>x</sub> Emission Factor .....	0.0290 lb/MMBtu
CO Emission Factor .....	0.9200 lb/MMBtu
ROC Emission Factor .....	0.0083 lb/MMBtu

**RESULTS**

	<u>lb/hr</u>	<u>lb/day</u>	<u>TPY</u>
Nitrogen Oxides (as NO <sub>2</sub> ) .....	0.36	8.7	1.59
Sulfur Oxides (as SO <sub>2</sub> ) .....	0.14	3.5	0.63
PM <sub>10</sub> .....	0.10	2.4	0.43
Total Suspended Particulate (PM) ..	0.10	2.4	0.43
Carbon Monoxide .....	4.56	109.5	19.99
Reactive Organic Compounds (ROC)	0.04	1.0	0.18

Hourly Heat Release .....	4.960 MMBtu/hr
Daily Heat Release.....	119.040 MMBtu/day

Attachment: 2

Date: 05/11/98

**Exempt Diesel-fired Engine CALCULATION WORKSHEET (ver. 5.0)****DATA**

Permit No. ....	9822
Owner/Operator .....	SB County/Sephic Assoc. Inc.
Facility/Lease .....	Foxen Landfill
EngineType .....	Piston Diesel
Mfg. ....	MQ Power Corp.
Model No. ....	DCA-40SSI
Serial/ID No. ....	no data
Horsepower .....	57 Bhp
EngineType .....	Comprs. Ignition
Mfg. ....	no data
Model No. ....	no data
Max. Firing Rate .....	0.388 MMBtu/hr
Max. Annual Heat Input .....	3,398.880 MMBtu/yr
Daily Operating schedule .....	24 hrs/day
Yearly Load factor (%) .....	100 %
Fuel Type .....	Diesel Fuel #2
High Heating Value .....	140,000 Btu/gal
Sulfur Content of Fuel .....	0.05 wt. % S
Nitrogen Content of Fuel .....	0.006 wt. % N
Classification .....	Permit Exempt per R.202.1.e @ <100 bhp
Firing Type (Utility Only) .....	n/a
PM Emission Factor .....	0.3100 lb/MMBtu
PM <sub>10</sub> Emission Factor .....	0.3000 lb/MMBtu
NO <sub>x</sub> Emission Factor .....	4.4100 lb/MMBtu
SO <sub>x</sub> Emission Factor .....	0.5100 lb/MMBtu
CO Emission Factor .....	0.9500 lb/MMBtu
ROC Emission Factor .....	0.3000 lb/MMBtu

**RESULTS**

	lb/hr	lb/day	TPY
Nitrogen Oxides (as NO <sub>2</sub> ) .....	1.71	41.1	7.49
Sulfur Oxides (as SO <sub>2</sub> ) .....	0.20	4.7	0.87
PM <sub>10</sub> .....	0.12	2.8	0.51
Total Suspended Particulate (PM) ...	0.12	2.9	0.53
Carbon Monoxide .....	0.37	8.8	1.61
Reactive Organic Compounds (ROC) .....	0.12	2.8	0.51
Hourly Heat Release .....	0.388 MMBtu/hr		
Daily Heat Release .....	9.312 MMBtu/day		
Annual Heat Release .....	3,398.880 MMBtu/yr		